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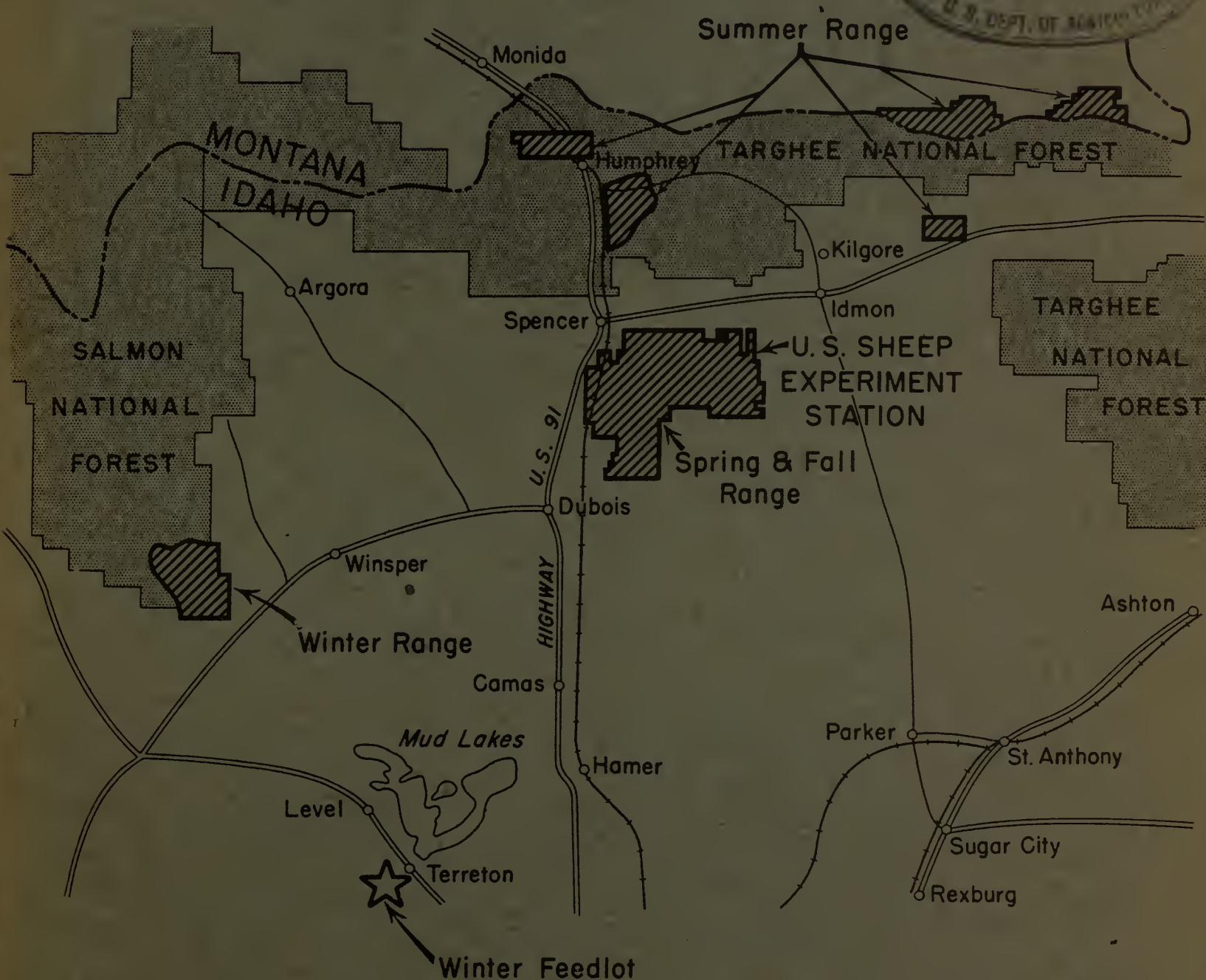
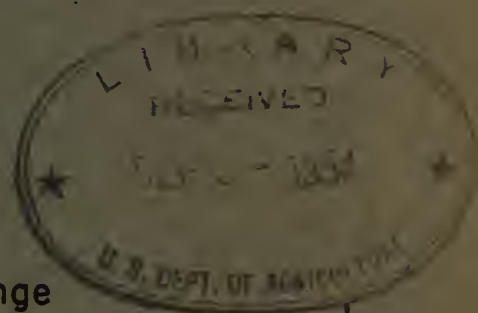
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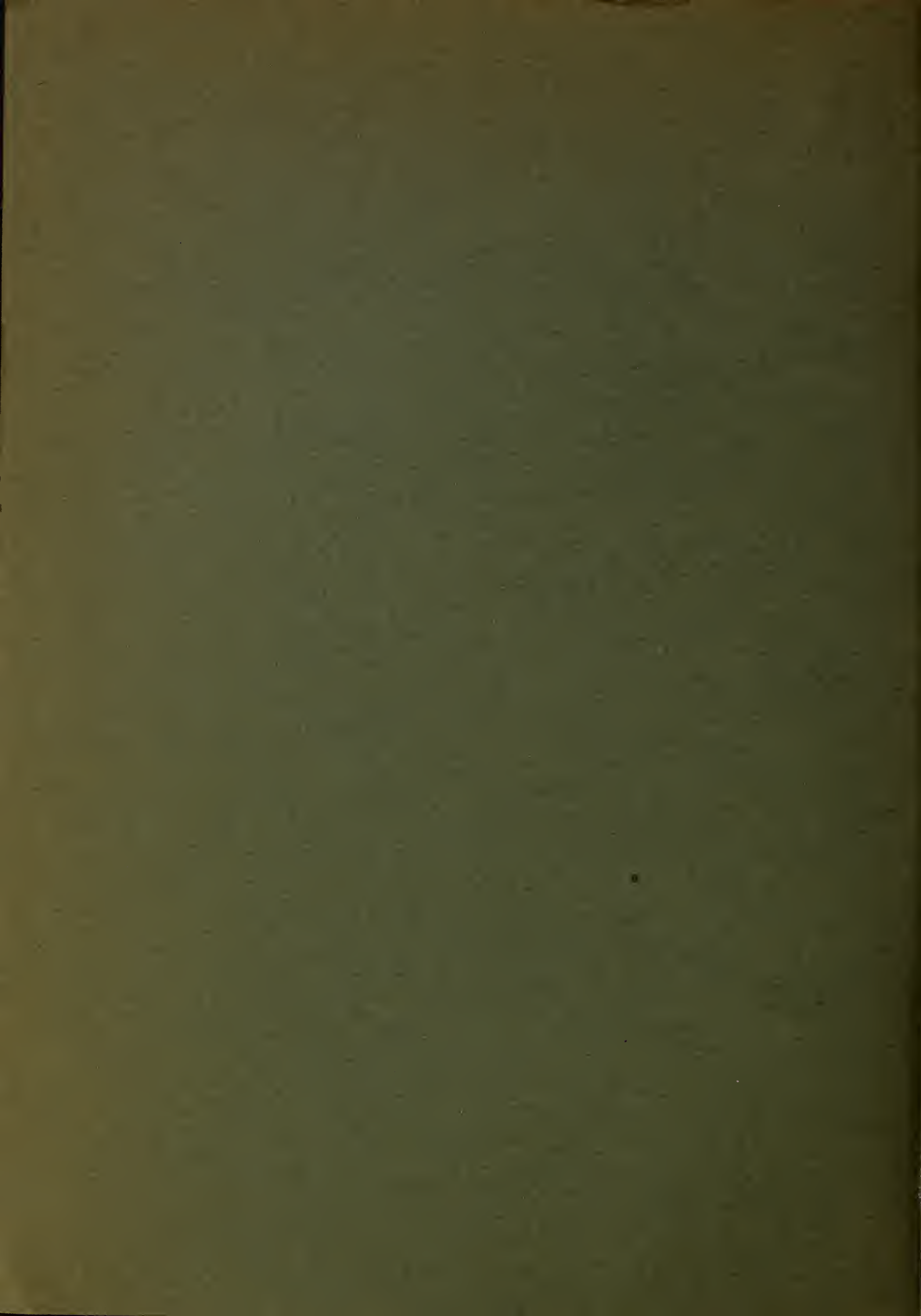
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF ANIMAL INDUSTRY

TENTH ANNUAL REPORT OF THE
U.S. SHEEP EXPERIMENT STATION

DUBOIS, IDAHO
JUNE 30, 1947



This report of research projects not yet completed is intended for the use of administrative leaders and workers in this or related fields of research, and not for general distribution



ANNUAL REPORT
U. S. Sheep Experiment Station
June 30, 1947

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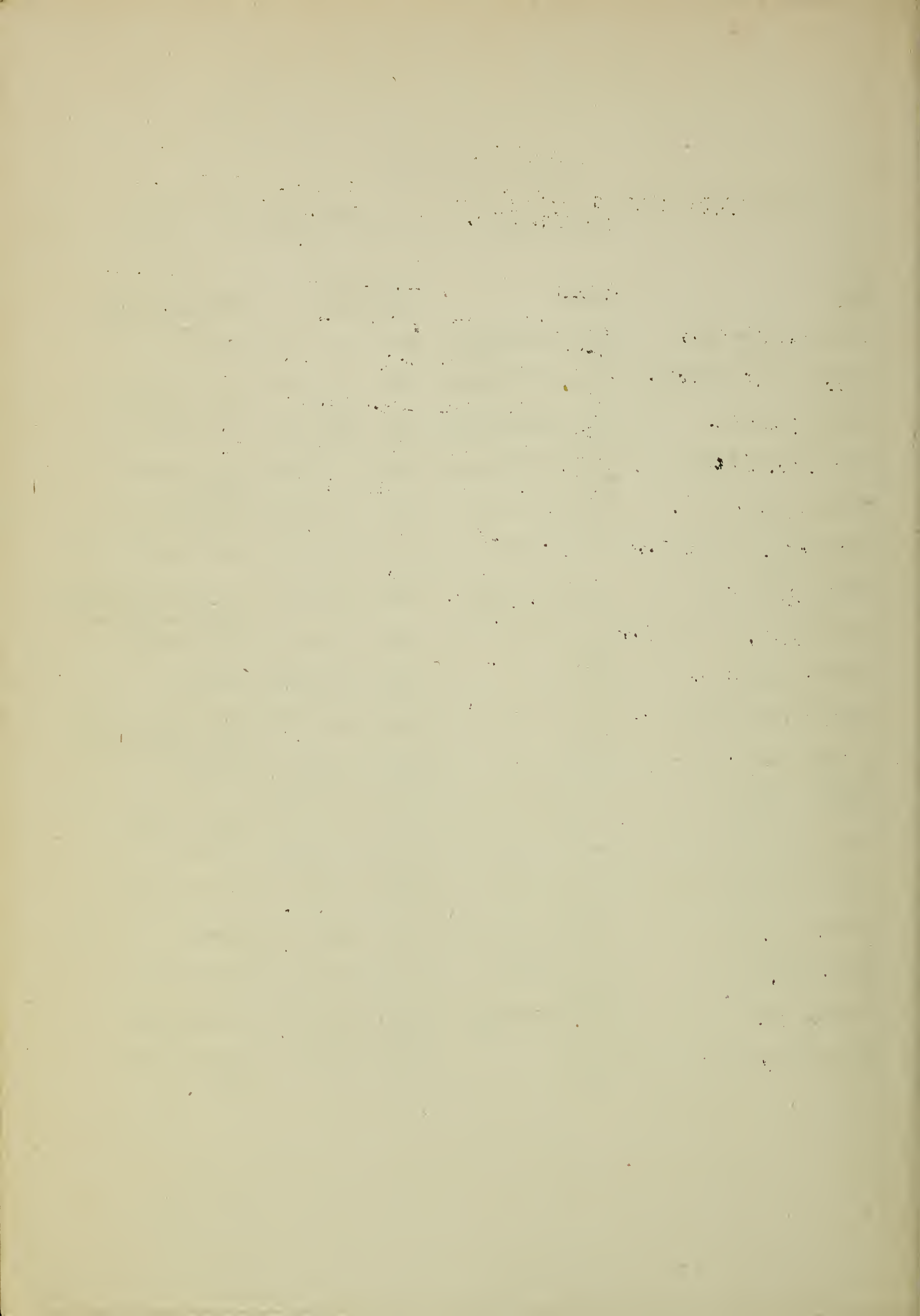
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ROSTER OF PERSONNEL

WESTERN SHEEP BREEDING LABORATORY AND U.S. SHEEP EXPERIMENT STATION
Dubois, Idaho, as of June 30, 1947

<u>Name</u>	<u>Rating</u>	<u>Date entered on duty</u>	<u>General Duties</u>
Nordby, Julius E.,	Animal Husbandman P-6	March 1, 1938	Director
Terrill, Dr. Clair E.,	Animal Husbandman P-5	July 3, 1936	Geneticist, Physiologist
Stoehr, John A.	Animal Husbandman P-4	Aug. 28, 1928	Operations
Emik, Dr. L. Otis,	Animal Husbandman P-4	July 7, 1941	Physiology and Genetics
Wilson, Lowell O.,	Scientific Aid SP-4	July 1, 1943	Assistant, Wool laboratory
Schaefer, Chester F.,	Clerk, CAF-5	June 22, 1936	Chief Clerk
Jeffery, Lee C.,	Foreman of Farm Laborers, CPC-6	June 7, 1924	General maintenance pumps, equipment
Rasmussen, Henry, Jr.,	Farm Laborer CPC-5	July 1, 1926	Farm Laborer
Hohman, Max E.,	Farm Laborer CPC-4	April 1, 1935	Shepherd
Landacre, Harold E.,	Farm Laborer CPC-4	April 6, 1939	Truck driver, gen- eral maintenance
Goldman, James R.,	Farm Laborer CPC-4	May 1, 1939	Shepherd
Howard, John H.,	Farm Laborer CPC-4	Oct. 2, 1944	Shepherd and Camp Tender
Ingram, Pete F.,	Farm Laborer CPC-4	April 20, 1947	Shepherd
Phillips, Walter H.,	Farm Laborer CPC-4	March 16, 1935	Truck Driver
Powell, Fred A.,	Farm Laborer CPC-4	May 11, 1935	Teamster
Swink, Albert B.,	Farm Laborer CPC-4	May 31, 1946	Farm Laborer
Zufelt, Glenn	Skilled Laborer Unall.	May 20, 1947	Farm Laborer
Nantz, Dorinda R.,	Laborer CPC-2	June 16, 1941	Janitress and Cook



PUBLICATIONS
Fiscal year 1947

(Title of papers from 1 to 56 appear in 1946 Annual Report. See also Annual Report 1947 Western Sheep Breeding Laboratory for additional publications by the staff in 1947.)

Papers identified by an asterisk (*) have been contributed to by the Western Sheep Breeding Laboratory.

51. Effects of Some Environmental Factors on Weanling Traits of Range Columbia, Corriedale and Targhee Lambs. L. N. Hazel and Clair E. Terrill, Jour. An. Sci. 5(3): 318-325, August, 1946.
52. Heritability of Weanling Traits in Range Columbia, Corriedale and Targhee Lambs. L. N. Hazel and Clair E. Terrill. Jour. An. Sci. 5(4): 371-377, November, 1946.
- *54. Length of Gestation in Range Sheep. Clair E. Terrill and L. N. Hazel, Amer. Jour. Vet. Res. 8(26): 66-72, January 1947.
56. Breed Crosses Used in the Development of Targhee Sheep. Clair E. Terrill. Jour. An. Sci. 6(1): 83-92, February, 1947.
- *57. Range Sheep Improvement Through Selection. Clair E. Terrill. National Wool Grower 36(12): 17-19, December, 1946.
58. Color on the Legs of Sheep. Its Inheritance in the Columbia and Targhee Breeds. Clair E. Terrill. Jour. Hered. 38(3): 89-92, March, 1947.
59. Effects of Some Environmental Factors on Yearling Traits of Columbia and Targhee Ewes. Clair E. Terrill, G. M. Sidwell and L. N. Hazel. Jour. An. Sci. 6(2): 115-122, May, 1947.
- *60. It's the Clean Wool in the Fleece that Pays Off. Elroy H. Pohle. National Wool Grower 37(5): 19-20, May, 1947.
- *61. Statistical Treatment of Counts of Trichostrongylid Eggs. L. Otis Enik. To appear in Biometrics.
- *62. Factors Affecting the Estimation of Concentration of Sperm in Ram's Semen by the Photoelectrometric Method. L. Otis Enik and George M. Sidwell. To appear in Journal of Animal Science.
63. Development of Targhee Sheep Through Crossing of Breeds. Clair E. Terrill and John A. Stochr. To appear in Woolgrowers' magazines.
- *65. Gestation Period in Sheep. Clair E. Terrill and John A. Stochr. To appear in Woolgrowers' magazines.

66. Effects of Some Environmental Factors on Yearling Traits of Columbia and Targhee Rams. For Journal of Animal Science.
- *69. Effect of Feed and Sickness on Wool Growth. Elroy M. Pohle. National Wool Grower Vol. 37, No. 6, June 1947.

ABSTRACTS

- *16. Factors Affecting the Estimation of Concentration of Sperm in Ram's Semen by the Photocolorimetric Method. L. Otis Erik and George H. Sidwell. Anat. Rec. 97(3): 69-70, March, 1947.
17. The Nature of Genetic Resistance of Sheep to Trichostrongylid Worms. L. Otis Erik. Jour. An. Sci. 5(4): 413-414, Nov., 1946.
18. Inheritance of Color on the Legs in Columbia and Targhee Sheep. Clair E. Terrill, Jour. An. Sci. 5(4): 414, November, 1946.

PROGRESS IN DEVELOPING LINES OF COLUMBIA AND TARGHEE SHEEP

Matings of Columbias were continued in 10 lines and 3 test pens in the fall of 1946. The total number of ewes bred was practically the same as in 1945 and included 456 in lines, 124 in crosslines and 51 in test pens. In addition 50 Rambouillet ewes were bred to Lincoln rams and 20 Targhee ewes were bred to a Leicester ram. The offspring of these matings may be used in Columbia breeding if they prove to be satisfactory for that purpose.

Matings of Targhee ewes in 1946 were continued in the 8 regular lines and the 4 lines involving Rambouillet x Corriedale crosses. An additional Targhee line was initiated with selected first cross Columbia-Rambouillets. A total of 397 ewes were bred in the 13 lines and 155 ewes in 8 test pens. The test pens were made up largely of first cross ewes. In addition, matings were made of a Leicester ram to 20 Rambouillet ewes, a New Zealand Merino ram to 9 Columbia ewes and 31 Rambouillet ewes to Columbia rams. Offspring from these matings may be used in Targhee breeding if they are suitable for that purpose.

SELECTION PRACTICED WITH COLUMBIA AND TARGHEE YEARLING LAMBS

The selection differentials at weaning age represent the first measure of progress toward improvement on each crop of lambs. Considerable later selection is practiced on ram lambs, but most of the effective selection of ewes is made at weaning age.

The selection differentials or advantages of the selected lambs for 1946 in the following table represent the difference between

their average and the average for the entire group after corrections for environmental influences have been made. The percent of ram lambs saved, based on the number present at weaning was 75 and 48 for Columbias and Targhees, respectively. The percent of ewe lambs saved was 78 and 82 for Columbias and Targhees, respectively. In each case the percent of lambs saved is considerably higher than for the previous year.

Selection differentials for Columbia and Targhee weanling lambs in 1946.

		Staple length (cm.)	Weaning weight (lbs.)	Type score	Condi- tion score	Face covering score	Neck folds score
<u>Columbia</u>							
Rams	Advantage of selected lambs	.05	2.46	.12	.09	.15	0
	Relative emphasis	.06	.21	.27	.18	.36	0
Ewes	Advantage of selected lambs	-.07	1.15	.05	.12	.06	.01
	Relative emphasis	0	.10	.11	.24	.14	.03
<u>Targhee</u>							
Rams	Advantage of selected lambs	.14	2.76	.17	.15	.04	.05
	Relative emphasis	.31	.28	.37	.29	.07	.11
Ewes	Advantage of selected lambs	0	.97	.08	.12	.09	.03
	Relative emphasis	0	.10	.17	.24	.15	.07

The relative emphasis each trait received in selection was determined by dividing the selection differential by the standard deviation. In general, type and condition received greatest emphasis followed by face covering and body weight. Staple length and neck folds received the least attention. Of course, neck folds could not be given much attention, as few folds were present and therefore much selection against folds was not possible nor necessary. It was not intended to give little attention to staple length, but it is difficult in selecting lambs to give as much attention to traits which are not easily seen, such as staple length, as it is to traits which are readily apparent, such as body type.

A comparison of the relative emphases given to Columbia and Targhee traits with those for Rambouillots, particularly in ewe lambs where the percent saved is somewhat comparable, shows that selection was more effective in the Rambouillet ewe lambs even though a higher percent were saved except in some cases for type and condition. This was probably due to the use of a selection index for Rambouillots.

INCREASING ACCURACY OF SELECTION ON YEARLING TRAITS OF COLUMBIA AND TARGHEE RAMS

Targhee rams

Selection of stud rams to become sires is the most important operation in the improvement of sheep through breeding. When selections are based on production records it is essential to know the effect of measurable environmental factors on these records. Then the effect of non-genetic factors may be minimized before selections are made.

The effects of age of dam, type of birth, year of birth and age at shearing on grease fleece weight, clean fleece weight, staple length, body weight, type, condition, fleece covering and neck folds were studied on 359 Columbia and 213 Targhee yearling rams. These rams were born during the years 1941 to 1945.

The effect of environmental factors was greatest on grease fleece weight, body weight and clean fleece weight and least on fleece covering and staple length. Year of birth was the most important environmental source of variation and age of dam was least important. Age of dam was more important in Columbias than in Targhees while the effect of yearling age was more important in Targhees than in Columbias.

Single rams had heavier bodies and fleeces than twins. Fleece and body weights, staple length, type and condition improved with increasing age at shearing. In Columbias, ram offspring from mature dams had heavier grease fleece weights and body weights than those from 2-year-old dams.

Accuracy of selection of Columbia and Targhee rams may be increased by adjusting grease fleece weights, clean fleece weights, body weight, type and condition for years; grease fleece weight, Clean fleece weight and body weight for age at shearing; body weight for type of birth; and in Columbias grease fleece weight and body weight for age of dam.

THE EFFECT OF INBREEDING ON YEARLING COLUMBIA AND TARGHEE RAMS

In the formation of inbred lines of sheep there is usually a wide variation in the degree of inbreeding among the rams available for possible use in breeding. It is important to determine the effect of inbreeding on the various traits which are involved in

selection. Adjustment should then be made for the effect of inbreeding, where it is important, to avoid an unnecessary conflict between inbreeding and selection.

The effect of inbreeding on grease fleece weight, clean fleece weight, staple length, body weight, type, condition, face covering and neck folds were studied on 359 Columbia and 213 Targhee yearling rams. These rams were born during the years 1941 to 1945.

The effect of inbreeding was much more important in Targhees than in Columbias. Fleece and body weights, staple length, type and condition became poorer with inbreeding. Inbreeding had a greater effect on body weight, type and condition than on other traits and these should be adjusted for inbreeding before selections are made.

CROSSES OF BREEDS FOR TARGHEES

The weanling averages, adjusted for environmental effects, various breed crosses and Targhees in 1946 are presented in the following table:

Broods	No. of lambs	Face covering	Staple length	Weaning weight	Type	Condi- tion	Neck folds
Targhee	219	3.68	4.02	76.01	1.92	2.15	1.10
Rambouillet x Corriedale	97	3.49	4.02	74.28	2.01	2.13	1.11
Columbia x Rambouillet	95	3.59	3.83	79.56	1.99	2.09	1.30
N.Z. Merino x K ₂ ewes	12	3.19	3.94	75.68	1.85	1.57	1.47
N.Z. Merino x T ₁ ewes	14	3.17	3.95	73.10	1.88	1.58	1.52

The Rambouillet x Corriedale offspring were similar to straight Targhees, being slightly poorer in weaning weight and type, but having more open faces. The Columbia x Rambouillet offspring were also similar to Targhees but having greater weaning weights, more open faces, slightly poorer type and more neck folds. The Merino crosses were similar to Targhees at weaning age. They had more open faces and better type and condition scores. They were slightly smaller, and had considerably more folds. The offspring of the two kinds of ewes bred to the Merino ram were very similar except those from the K₂ dams were slightly larger.

INHERITANCE OF COLOR ON THE LEGS OF COLUMBIA AND TARGHEE SHEEP

The inheritance of brown or black color on the lower part of the legs was studied on 1,517 Columbia and 1,051 Targhee weanling lambs born from 1941 to 1945, and on their sires and dams. Twelve percent of the Columbia lambs and 15 percent of the Targhee lambs had leg color. The percentage of dams with color was higher than in their offspring in each breed. This indicates that little selection against color has been practiced in ewes, but that some progress has been made in eliminating color through selection of the sires.

No relation was found between leg color and other weanling traits including face covering, length of staple, body weight, type, condition, and neck folds. The occurrence of leg color was unaffected by sex, twinning or age of dam.

Leg color appears to be recessive because many lambs with color are from parents without color. However, when both parents had color less than half of the offspring had color, indicating that more than one pair of genes are involved. The proportion of offspring with color increased as the degree of color in the parents increased indicating that the genes involved are cumulative in their effect.

Heritability of leg color was estimated from intra-sire regression of offspring on dam and from half-sib correlations. The latter gave lower estimates probably because the sires had been selected for absence of color. Estimates of heritability from intra-sire regression of offspring on dam were 0.26 ± 0.05 and 0.34 ± 0.07 for Columbias and Targhees, respectively. These estimates are fairly consistent with progress made from selection. Further progress toward eliminating leg color will be slow because its incidence is already low. Culling of all rams and ewes with color would reduce the percentage of lambs with color to about 7 in Columbias and 12 in Targhees.

THE USE OF PRODUCTION RECORDS IN THE PUBLIC AUCTION OF RAMS

In the past it has been difficult to make production records of sale rams available to the purchaser because it was impossible to present records which were comparable from ram to ram and year to year. It is desirable to make these records available to the purchaser, since the traits which are most important economically are often not readily visible to the buyer. The development of methods for adjusting records for environmental effects including age and year makes possible the presentation of some production records in the sale catalog.

In the fall of 1946 lifetime averages of grease fleece weight, clean fleece weight and staple length were presented for each ram available

for sale. Records such as body weight, type and face covering were not included as these are relatively apparent in the ram. The availability of production records met with considerable favorable comment from buyers of rams.

By making records available to the buyer it was possible to make a preliminary analysis to determine the relative value of the various traits in terms of the price paid for the rams. Lifetime records of grease fleece weight, clean fleece weight and staple length were taken from the sale catalog. These lifetime records were adjusted for both age and years to make the rams as comparable as possible. In addition, an adjustment was made to give added credit for the increase in accuracy of the lifetime average with an increased number of records making up the average. Body weights were taken during the first week in September. Type and condition scores were taken just following shearing in the first part of June. The sale was held on October 2, 1946. Twenty-three yearling Columbia rams which were sold as singles were included in the analysis. Correlation and regression coefficients with price of sale as the dependent variable are given in the following table:

	<u>Fleece weight</u>		<u>Staple</u>	<u>Body</u>		<u>Condi-</u>
	grease	clean	length	weight	Type	tion
Correlation coefficients	.33	.27	-.07	.42*	-.60**	-.62**
Regression coefficients	\$32.36	\$62.25		\$5.14*	-\$174.96**	-\$249.12**

- * Signifies probability of chance occurrence $< .05$
 ** Signifies probability of chance occurrence $< .01$

Type and condition scores had the highest relationship with sale price followed in order by body weight, grease fleece weight, clean fleece weight and staple length. The regression coefficients indicate the change in sale price with each unit change in the respective trait. The minus signs for type and condition indicate increased sale price with improved type or condition score since the scores became smaller as the type or condition improves.

FERTILITY TESTS WITH COLUMBIA AND TARGHEE RAMS

A study was conducted to identify and evaluate the various factors contributing to the accuracy of estimating concentration of sperm in ram's semen and to devise methods which would give the most accurate results. The relation between counts of sperm made with a hemacytometer and turbidity readings with a photoelectric colorimeter were analyzed. The technique adopted for use with the colorimeter involved dilution at 1:200 in a 4 percent solution of

chlorazene in distilled water. Accuracy of estimating sperm concentration with the colorimeter was increased by scoring for the amount of debris in the semen. The colorimeter was slightly more accurate and much more rapid for estimating concentration of sperm in ram's semen.

These improvements in methods for estimating semen quality and in predicting fertility of rams from semen quality have practical importance in increasing our ability to select rams of high fertility.

COMMERCIAL GRADES OF COLUMBIA FLEECES

The results of the commercial grading of Columbia fleeces for 1946 and the preceding 4-year period are shown in the following table:

Sex	Year	Yearling			Mature		
		1/2	3/8	1/4	1/2	3/8	1/4
		Blood	Blood	Blood	Blood	Blood	Blood
		%	%	%	%	%	%
Rams	1942-45	6	60	34	2	58	40
	1946	5	57	38		26	74
Ewes	1942-45	5	66	29	6	53	41
	1946	4	42	53	3	47	50

There was a noticeable shift toward coarser grades in 1946 in all groups. This was most pronounced for yearling ewes and mature rams. The shift from 3/8 blood to 1/4 blood in the yearling ewes is probably largely environmental as only a slight change in that direction was noted in the yearling rams.

COMMERCIAL GRADES OF TARGHEE FLEECES

The results of the commercial grading of Targhee fleeces for 1946 and the preceding 4-year period are shown in the following table:

Sex	Year	Yearling			Mature				
		Fine	1/2	3/8	Fine	Fine	1/2	3/8	1/4
		Staple	Blood	Blood	French	Staple	Blood	Blood	Blood
		%	%	%	%	%	%	%	%
Rams	1942-45	8	78	14		2	88	8	2
	1946	8	81	11	3	6	71	20	
Ewes	1942-45	7	79	14	2	11	79	7	1
	1946	8	76	16	5	13	70	10	2

More of the mature Targhee fleeces fell in the fine grades in 1946 than in previous years. There was also a tendency for greater variability in grades in 1946 with the exception of yearling rams.

SUMMARY FOR INDIVIDUAL GRADE LOTS 1946 CLIP

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Lot No.	Description	No. Fl.	Net Gr. Wt.	Clean yield (%)	Net clean weight (lbs.)	Net Adj. sort to grease weight	Percent	Shr. (lbs.)	Ave. fleece weight (lbs.)	Ave. clean fleece weight (lbs.)	WFA Appraisal		Ave. clean fleece value per lb. Boston	Ave. grease value per lb. Boston	Net grease value Boston
											Value per clean pound	Total clean value			
1															
Mature Ewes	#1 Clear	346	2730	52.9	1444	75.52					\$1.25	\$1805.00			
1/2 Blood	#1 Burry	329	52.3	172	9.10						1.17	201.24			
	Stain-low-tags	57	32.1	18	1.58						1.06	19.08			
	Paint	230	40.8	94	6.36						1.18	110.92			
	Crutchings	214	50.6	108	5.92						1.01	109.08			
	Tags	55	35.4	19	1.52						1.01	19.19			
Totals and Averages		3615	51.3	1855	100.00	48.7	10.45	5.36	1.22	2264.51	6.54	.6260	.5800		
2															
Yearling Ewes	#1 Clear	172	1293	50.5	653	77.75					1.28	855.84			
	#1 Burry	128	39.8	51	7.70						1.20	61.20			
	Stain-low tags	133	32.1	43	8.00						1.06	45.58			
1/2 Blood	Paint	68	40.8	28	4.09						1.18	33.04			
	Tags	41	35.4	14	2.47						1.01	14.14			
Totals and Averages		1663	47.4	789	100.01	52.6	9.67	4.59	1.25	999.80	5.74	.5930	.5470		
3															
Rams	#1 Clear	73	763	47.7	364	81.52					1.28	465.92			
	#1 Burry	73	45.2	33	7.80						1.19	39.27			
1/2 Blood	Stained-low-tags	40	32.1	13	4.27						1.06	13.78			
	Paint	37	40.8	15	3.95						1.18	17.70			
	Tags	23	35.4	8	2.46						1.01	8.08			
Totals and Averages		936	46.3	433	100.00	53.7	12.82	5.93	1.26	544.75	7.47	.5829	.5369		
4															
Mature Ewes	#1 Clear	403	3236	56.3	1823	76.07					1.17	2132.91			
3/8 Blood	#1 Burry	394	49.2	194	9.26						1.12	217.28			
	Stained-low-tags	98	40.5	40	2.30						1.00	40.00			
	Paint	212	40.2	85	4.98						1.04	88.40			
	Crutchings	250	50.6	126	5.88						1.01	127.26			
	Tags	64	35.4	22	1.50						1.01	22.22			
Totals and Averages		4254	53.8	2290	99.99	46.2	10.56	5.68	1.15	2628.07	6.53	.6190	.5730		

* Transportation cost per pound grease wool.

SUMMARY FOR INDIVIDUAL GRADE LOTS 1946 CLIP

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Lot No.	Description	No. Fl.	Net		Percent	Ave.		WFA Appraisal		Ave.		Net	
			Gr.	Clean		Net Adj.	Sort to	Value	per	clean	fleece	grease	value
		Wt.	yield	(%)	weight	clean	net		clean	value	weight	value	per lb.
					(lbs.)	(lbs.)	grease		pound	per lb.	(lbs.)	Boston	Boston
5	#1 Clear	102	798	55.9	446	73.01		\$1.17	\$521.82				
	#1 Burry		129	51.9	67	11.80		1.17	78.39				
	Stained-low-tags		100	40.5	40	9.15		1.00	40.00				
	Paint		42	40.2	17	3.84		1.04	17.68				
	Tags		24	35.4	9	2.20		1.01	9.09				
	Totals and Averages		1093	53.0	579	100.00	47.0	1.15	666.98	6.53	6.092	.5632	
6	#1 Clear	124	965	51.3	495	73.33		1.25	618.75				
	#1 Burry		180	45.0	81	13.68		1.20	97.20				
	Stained-low-tags		54	40.5	22	4.10		1.00	22.00				
	Paint		78	40.2	31	5.93		1.04	32.24				
	Tags		39	35.4	14	2.96		1.01	14.14				
	Totals and Averages*		1316	48.9	643	100.00	51.1	1.22	784.33	6.33	.5961	.5501	
7	#1 Clear	329	3402	57.1	1942	79.54		1.11	2155.62				
	#1 Burry		321	52.3	168	7.51		1.06	178.08				
	Stained-low-tags		118	40.5	48	2.76		1.00	48.00				
	Paint		180	40.2	72	4.21		1.04	74.88				
	Crutchings		204	50.6	103	4.77		1.01	104.03				
	Tags		52	35.4	18	1.22		1.01	18.18				
	Totals and Averages		4277	55.0	2351	100.01	45.0	1.10	2578.79	7.87	.6047	.5587	
8	#1 Clear	82	664	52.0	345	72.17		1.14	393.30				
	#1 Burry		133	47.4	63	14.46		1.10	69.30				
	Stained-low-tags		78	40.5	32	8.48		1.00	32.00				
	Paint		26	40.2	10	2.83		1.04	10.40				
	Tags		19	35.4	7	2.07		1.01	7.07				
	Totals and Averages		920	49.7	457	100.01	50.3	1.12	512.07	6.24	.5563	.5103	

* Low production due to environmental factors.

** Transportation cost per pound grease wool.

SUMMARY FOR INDIVIDUAL GRADE LOTS 1946 CLIP

Lot No.	Description	No. Fl.	Not Gr. Wt.	Clean yield (%)	Not Adj. clean weight (lbs.)	Percent sort to grease weight	Avo. grease weight (lbs.)	Avo. clean weight (lbs.)	WFA Appraisal		Avo. grease value per lb. Boston	Avo. grease value per lb. Boston
									Value	Total clean value		
9	#1 Clear	92	934	52.0*	486	78.62			\$1.17	558.62		
Rams	#1 Burry	152	152	45.4	69	12.79			1.12	77.28		
1 1/4 Blood	Stained-low-tags	44	44	40.5	18	3.70			1.00	18.00		
	Paint	29	29	40.2	12	2.44			1.04	12.48		
	Tags	29	29	35.4	10	2.44			1.01	10.10		
Totals and Averages												
		1188	50.1	595	99.99	50.0	12.91	6.47	1.15	686.48	7.44	.5759
10	Fine Crutchings	621	40.9	254					1.06	269.24		
11	X-Bred Crutchings	668	50.6	338					1.01	341.38		
12	Grading Locks	645	55.4	228					1.01	250.28		
13	Black, Brown, Grey	285	44.2	126		55.8	12.95	5.75	0.98	123.48	5.62	.4333
8/13	Low stained 3/8, 1/4 Blood	492	40.5	199					1.00	199.00		
8/13	Paint 3/8, 1/4 Blood	567	40.2	228					1.04	237.12		
1/7	Paint Fino, 1/2 Blood	1061	40.8	443					1.18	510.94		
1/7	Low stained tags	669	32.1	215					1.06	227.90		
-046**												

* Discrepancy Lot #9 in net finished weight (555-560 lbs.)

** Transportation cost per pound grease wool.

RECAPITULATION

Selection Practiced with Columbia and Targhee Weanling Lambs:

Selection in Columbia and Targhee weanling lambs is the first effective selection. Type and condition were emphasized more than face covering and skin folds because these breeds are not troubled much with these defects.

Increasing Accuracy of Selection on Yearling Traits of Columbia and Targhee Rams:

An effort has been made to evaluate environmental factors as they influence selection.

The Effect of Inbreeding on Yearling Columbia and Targhee Rams:

Inbreeding had a greater effect on body weight, type and condition than on other traits, and adjustments for inbreeding should be made before selections are made.

Crosses of Breeds for New Targhee Breeding:

In this exploratory effort the Columbia-Rambouillet cross excels in weaning weight, and condition, but has slightly less length of staple than the Corriedale - Rambouillet cross. The Merino ram on K₂ and T₁ ewes was encouraging and it is expected that some desirable genes can be converted into a Targhee line.

Inheritance of Color on the Legs of Columbia and Targhee Sheep:

The leg color is apparently recessive and the incidence in the flock is low, hence further improvement will be slow.

The Use of Wool Production Records in the Public Auction of Rams:

These records are greatly appreciated by the buyers. However, since wool production involves only one of the products from a sheep, and is of less importance than meat production, it is not to be expected that the prices paid would be as closely related to wool yield as to mutton conformation. Since records are available from only one year's sales records, it is doubtful if the information available is adequate to provide any definite conclusions.

Fertility Tests with Columbia and Targhee Rams:

The use of a colorimeter for estimating the value of ram's semen is an improvement in selecting rams of high fertility.

Commercial Grades of Columbia Fleeces:

The records show some increase in variability toward the fine side. This has yet to be verified from the cross-section study.

Summary of Individual Grade Lots - 1946 Clip

	Clean yield (%)	Clean weight (lbs.)	Value per clean lb. Boston	Value per fleece Boston
1/2 Blood - Mature ewes -- Average	51.3	5.36	\$1.22	\$6.54
1/2 Blood - Yearling ewes	"	47.4	4.59	5.74
1/2 Blood - Rams	"	46.3	5.93	7.47
3/8 Blood - Mature ewes	"	53.8	5.68	6.53
3/8 Blood - Yearling ewes	"	53.0	5.68	6.53
*3/8 Blood - Rams	"	48.9	5.19	6.33
1/4 Blood - Mature ewes	"	55.0	7.15	7.86
1/4 Blood - Yearling ewes	"	49.7	5.57	6.24
1/4 Blood - Rams	"	50.1	6.47	7.44

* Unusual conditions gave rise to low weights in rams producing 3/8 Blood fleeces.

